Contract Restructuring
Analysis of Costs and Risks

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Outline

- Background
- Approach and Assumptions
- Results
- Buyer & Seller Value Shifts
- Conclusions

Plant Description

- Multi-unit combined cycle / cogen plant
- Process steam from STG extraction or HRSG
- HRSG duct burners for add'l steam and power
- GTs operated at all times for steam reliability
- Redundancy provides high steam & power availability

High flexibility hobbled by lackluster efficiency

Key PPA Terms

- QF era contract with 10+ years remaining term
- Fixed purchase obligation with specific options:
  - ~ 20% capacity reduction anytime with short notice
  - ~ 40% capacity reduction weeknights with 1/2 day notice
  - ~ 50% capacity reduction weekends with 1 day notice
  - Last 10 years ~50% reduction anytime with 1 day notice
- Minimum annual deliveries for next 5 years
- Energy price = (heat rate * WACOG) + VO&M

Sources of Tension

Buyer

- WACOG shift post-divestiture
- Optionality challenges
- PPA becoming uneconomic
- LMP market risk
- Retail choice
- Potential PUC disallowances

Seller

- Locked-in fuel contracts
- Poor system efficiency
- Rigid thermal obligation
- Dispatch uncertainty
- High debt & equity costs
- Alternative supply options
- Lack of hedging options

Seller Solution – Revised PPA

- Maintain sales level - fixed purchases allows hedging
- Correct energy pricing (*and hedging*) deficiencies
- Create value by restructuring gas contracts and financing
- Share new value with buyer (lump sum payment)
- Flexibility to source energy generation
- PPA pricing tied to market prices
- Steam boiler for thermal flexibility

Is Buyer better off, and how to position for negotiations?

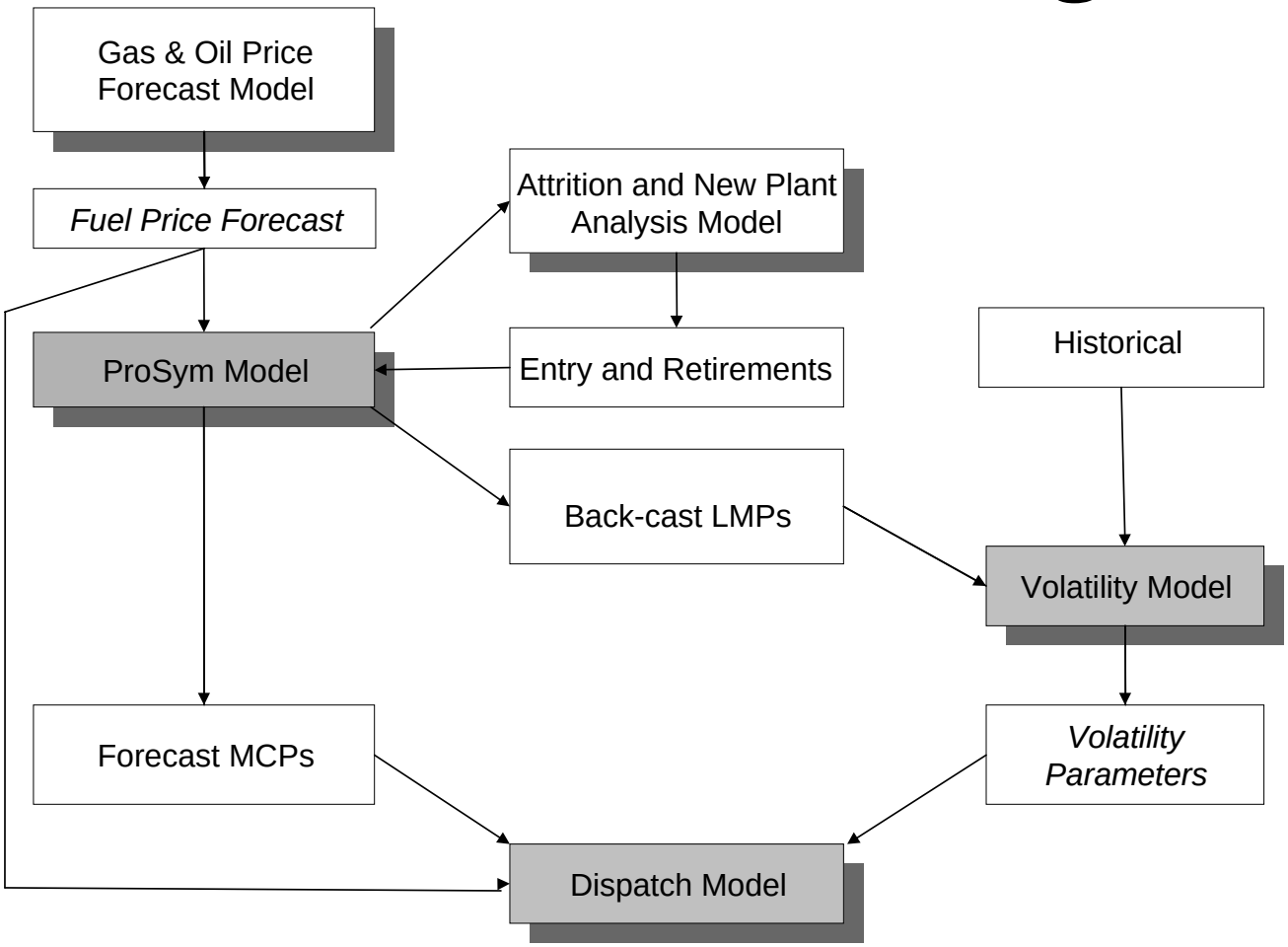
Approach and Assumptions

- Objective:
  - Determine true buyer & seller values
  - Simulate PPA and Revised PPA for both parties

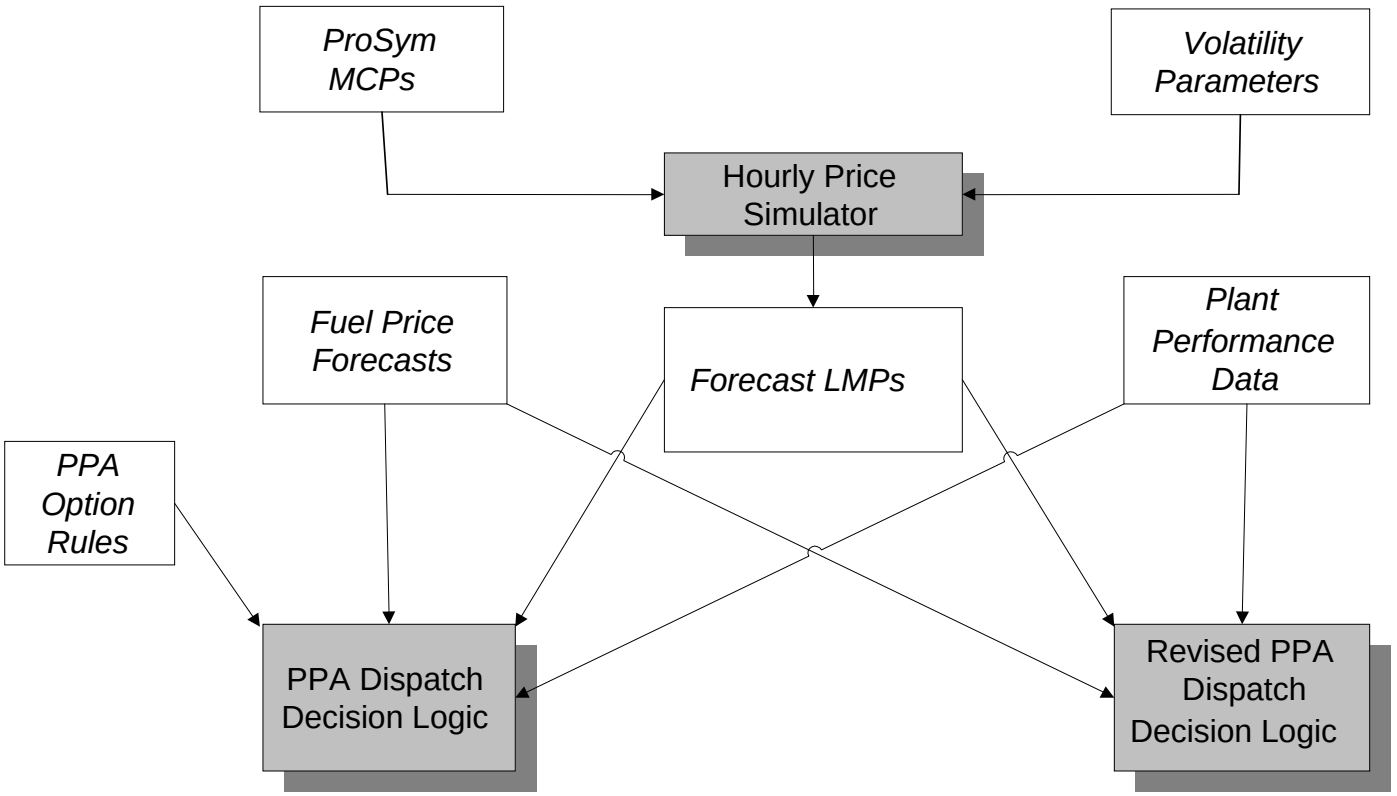
  Challenge is to calculate value of contract optionality
- Methodology:
  - ProSym chronological model to forecast cost-based MCPs
  - Volatility model to incorporate price uncertainty
  - Dispatch model to establish LMPs and estimate plant performance
  - Financial model to calculate Buyer and Seller impacts
  - Conduct sensitivities reflecting key risk factors

  Include direct and portfolio effects

MCP Forecasting



Volatility Model



Volatility Model

- Uncertainty around ProSym equilibrium price forecast
  - Econometrics model defines volatility parameters
  - Black-Scholes makes assumptions (normal distribution) and may not be appropriate for electricity (perishable)
  - Monte Carlo simulations generate forecast “bandwidth” and provide greater modeling flexibility
- Options approach captures Buyer’s flexibility

Market prices dictate dispatch decision!

Volatility Model

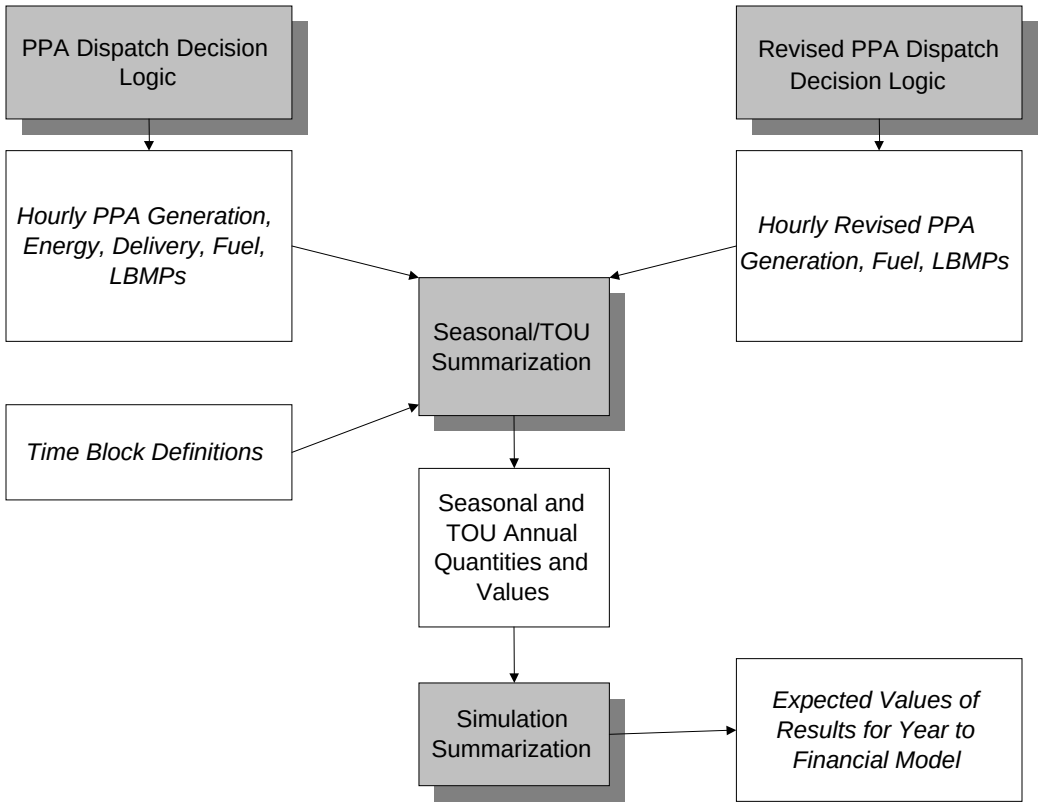
- ProSym "backcast" to establish historical statistical relationship
- ARIMA model chosen based on goodness-of-fit (R^2=77%) and parsimony

$$ln(LBMP_t) = C_1 * ln(ProSym_t) + Error_t$$

$$Error_t = C_2 * Error_{t-1} + Random\ Variable_t\ (normal\ distribution)$$

Parameters	Estimates	T-Statistics / Probabilities
C_1	0.974491	361.9421 / 0.0000
C_2	0.812267	172.9088 / 0.0000

Dispatch Model



Plant Operating Conditions

- Under PPA, output level is controlled by Buyer
- Seller selects actual plant configuration to achieve
- Model assumes most efficient configuration
- With Revised PPA, output determined by Seller at points of best efficiency

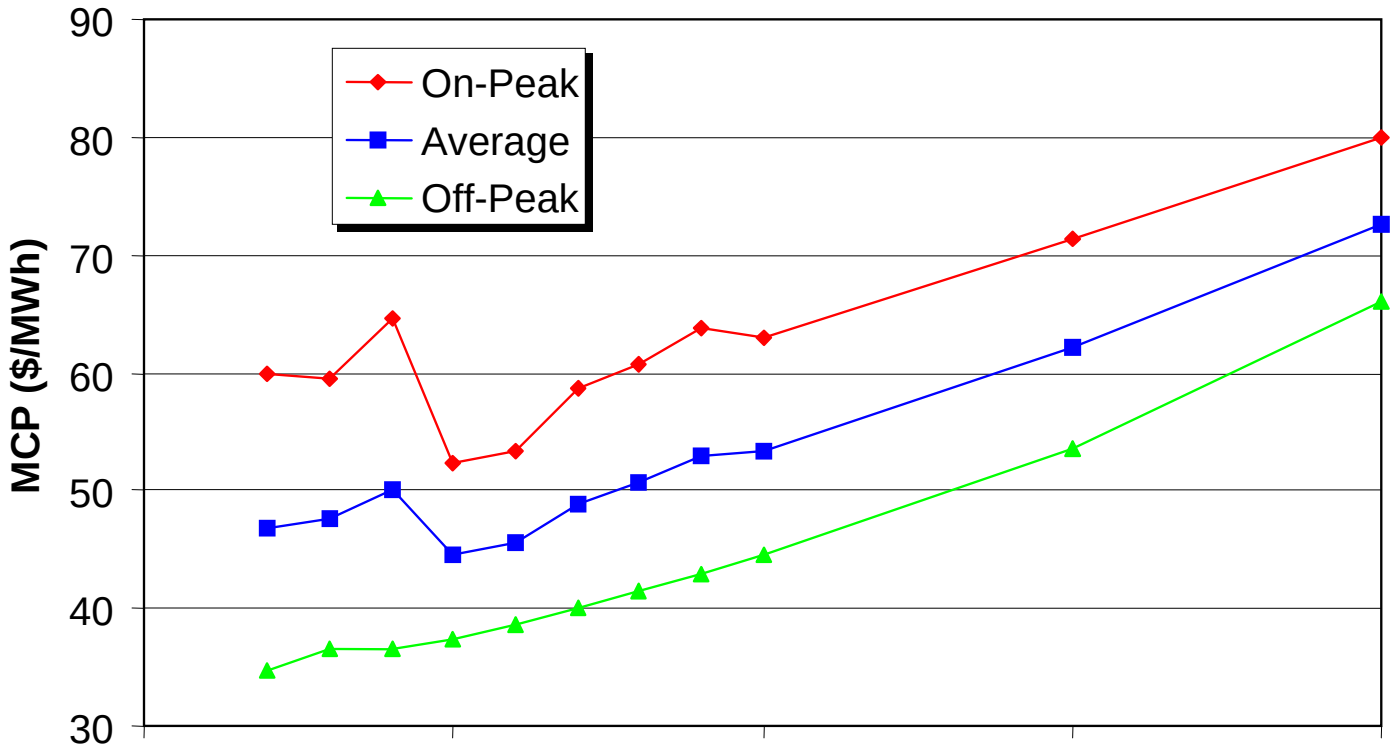
Model plant dispatch assuming Buyer has imperfect and perfect advance knowledge of market prices.

Results

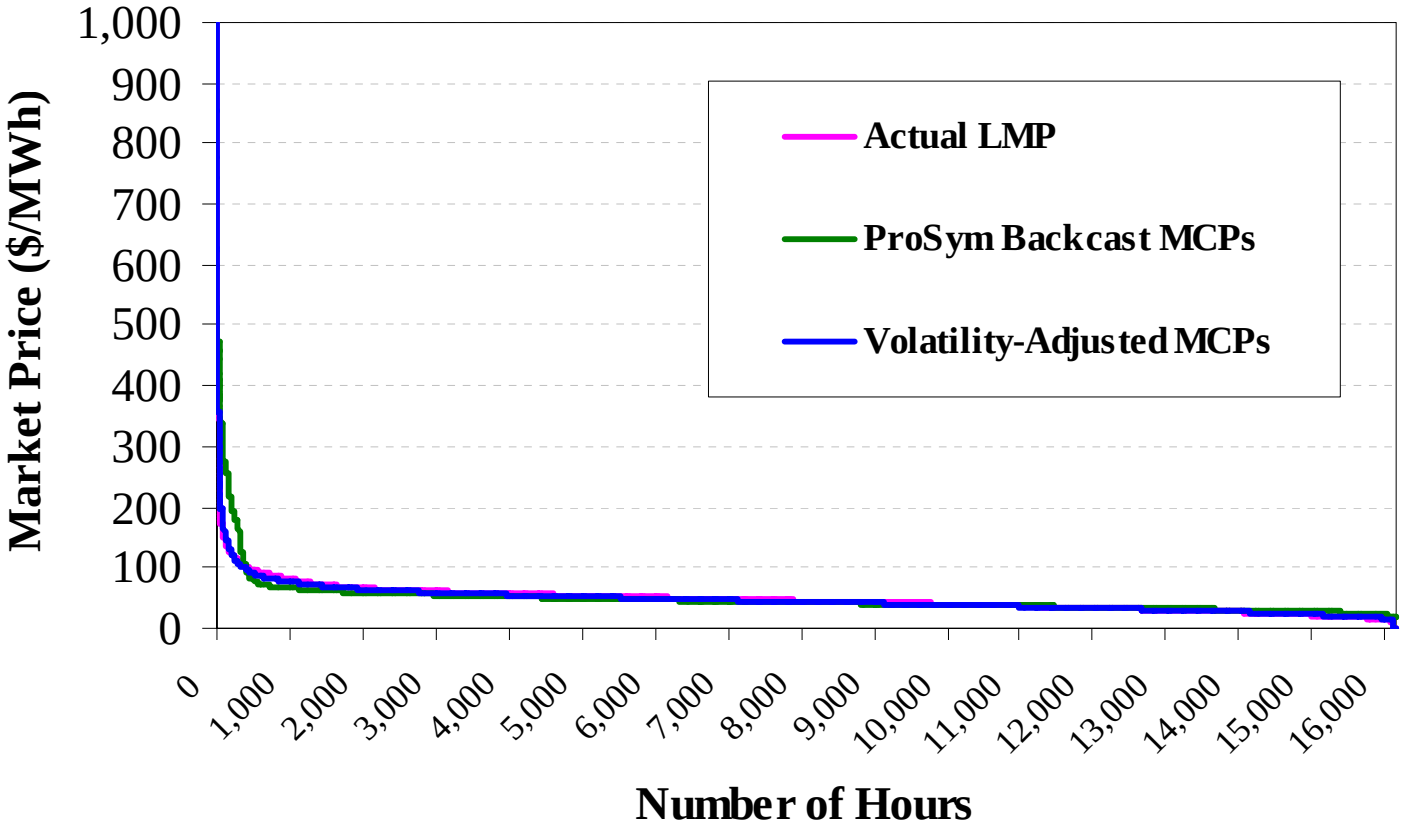
- ProSym MCPs
- LMP Forecast w/Volatility
- Market Heat Rates
- Plant Dispatch (PPA and Revisions) using Monte Carlo Simulations

ProSym MCPs

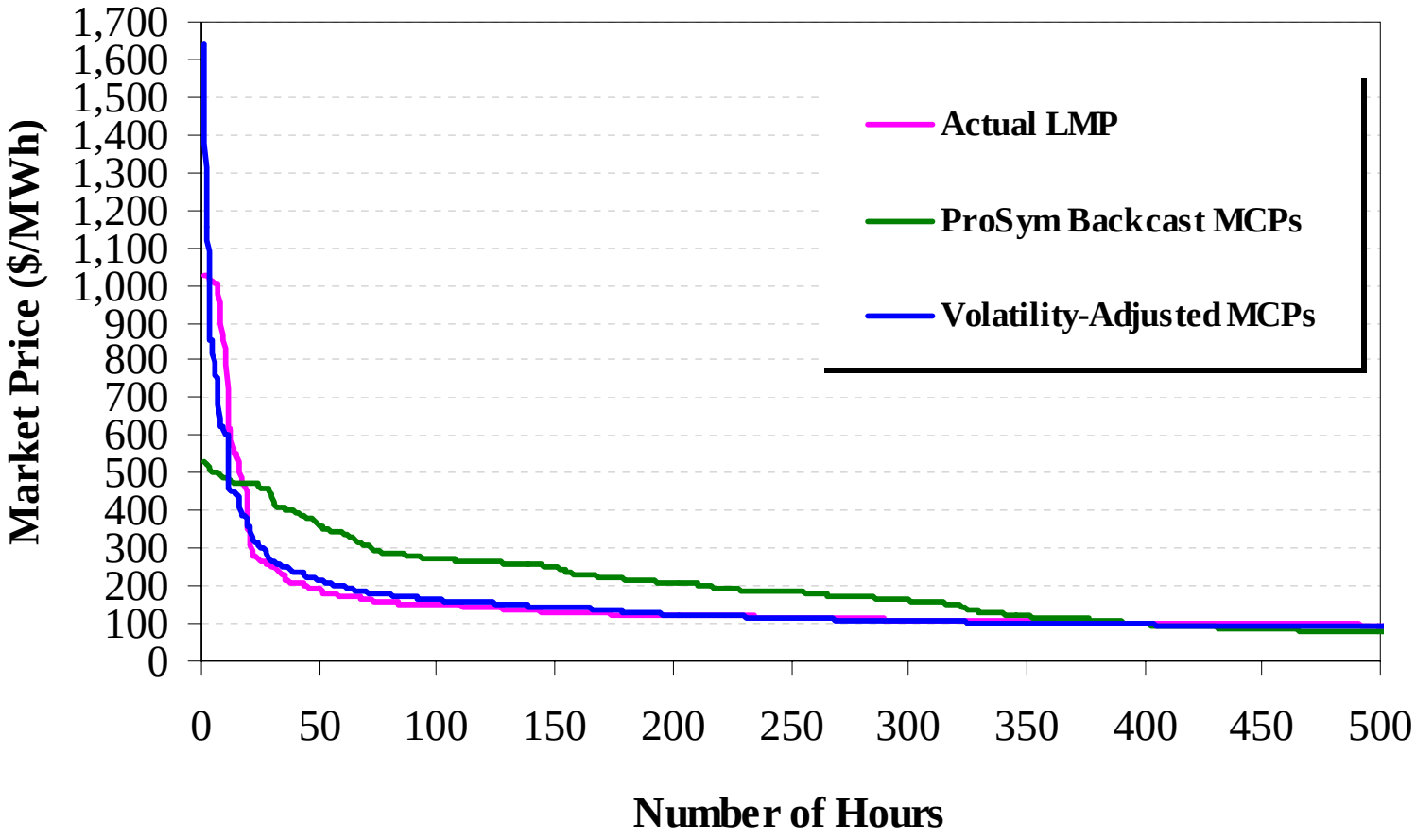
Base Case



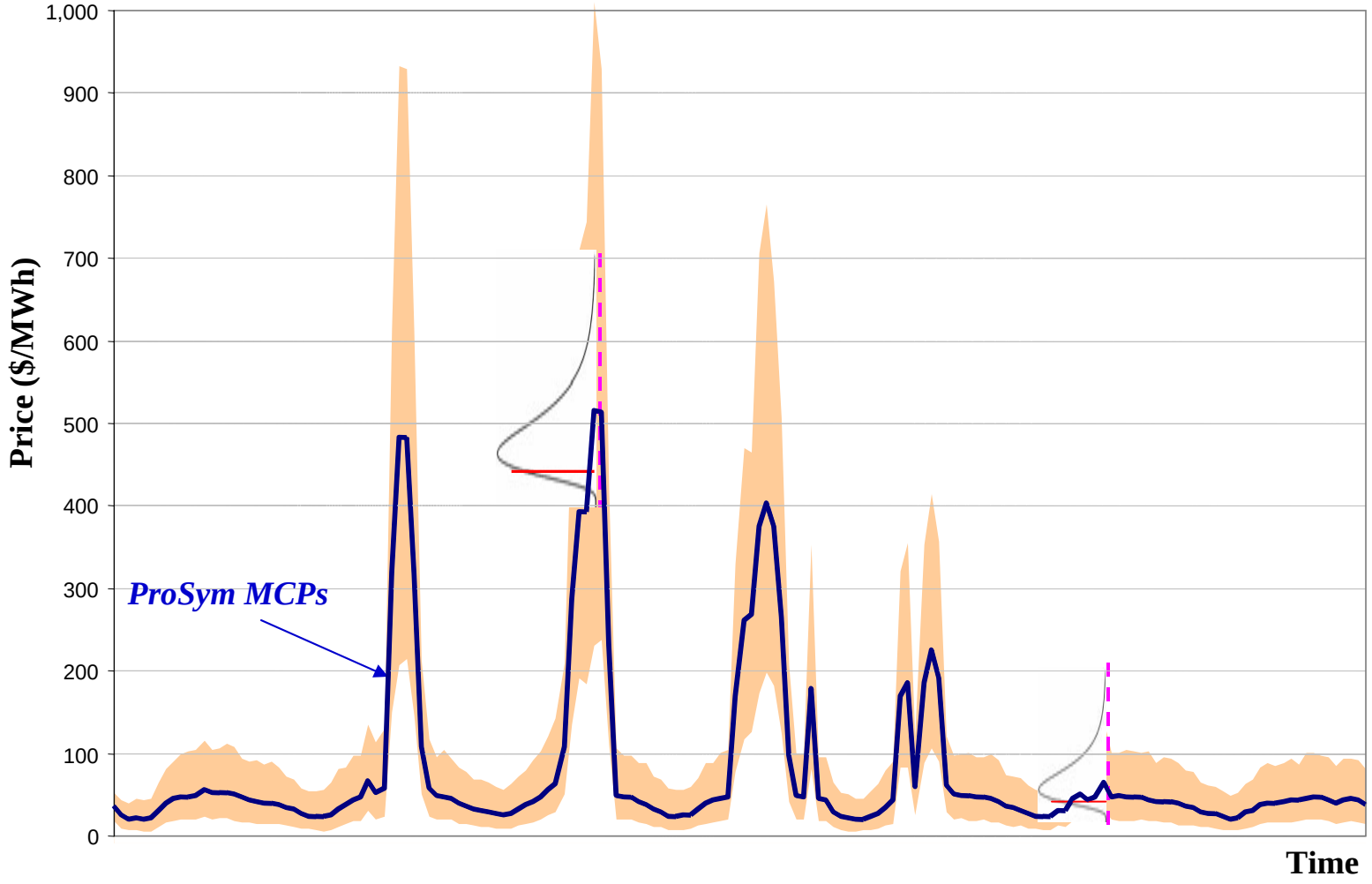
Simulated LMPs – All Hours



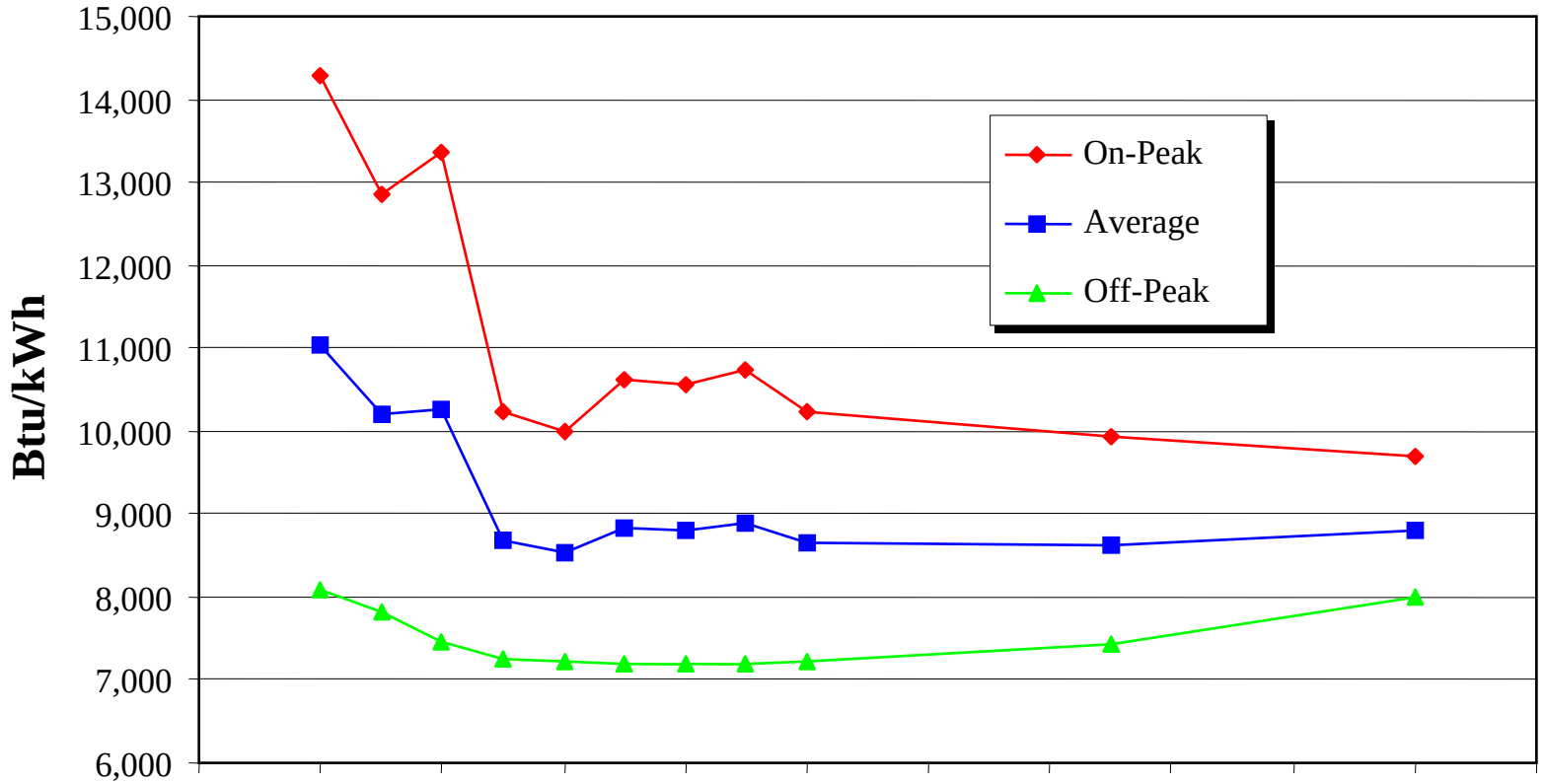
Simulated LMPs – Peak Hours



LMP Price Dispersion

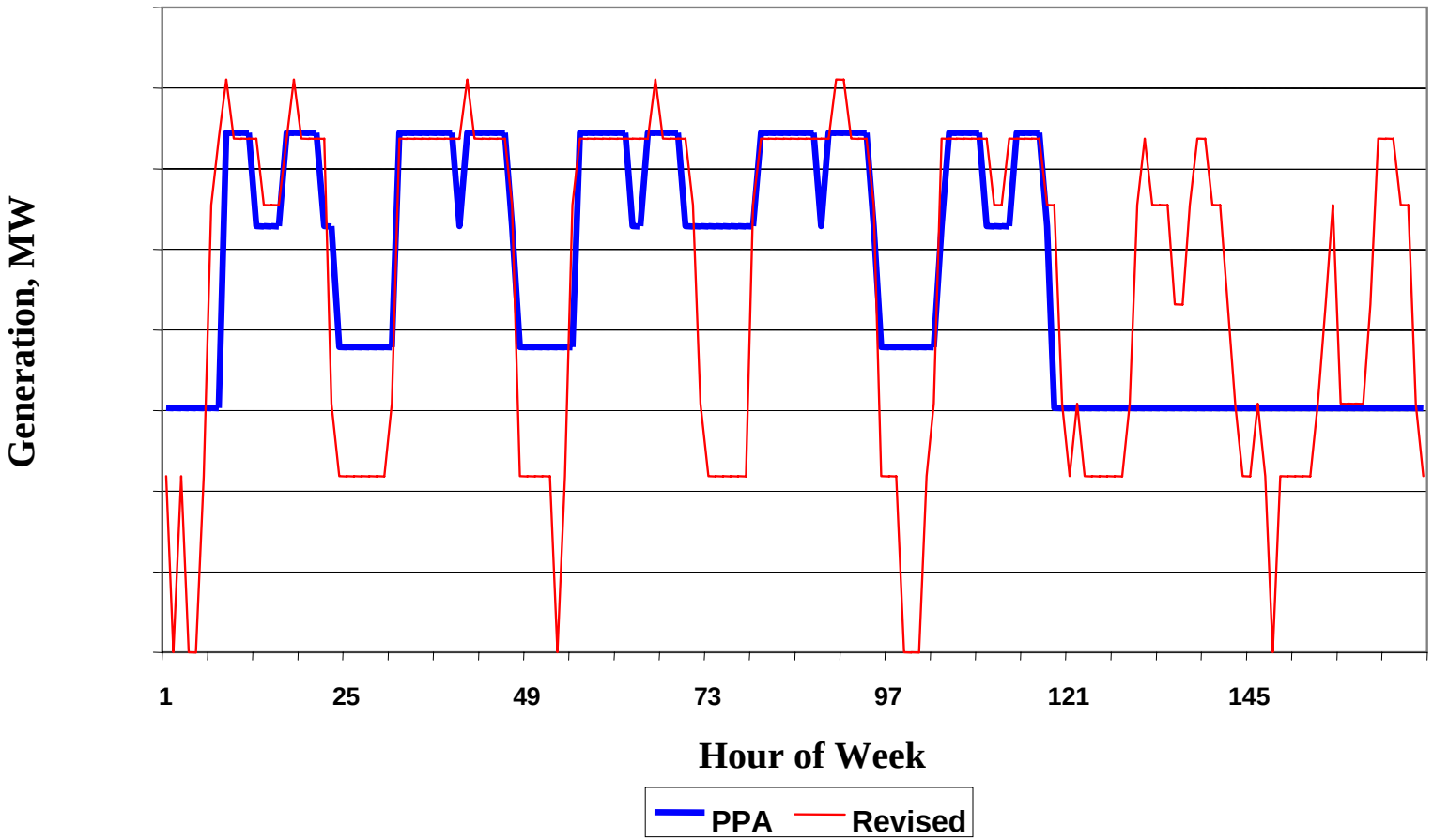


Market Heat Rate - Base Case

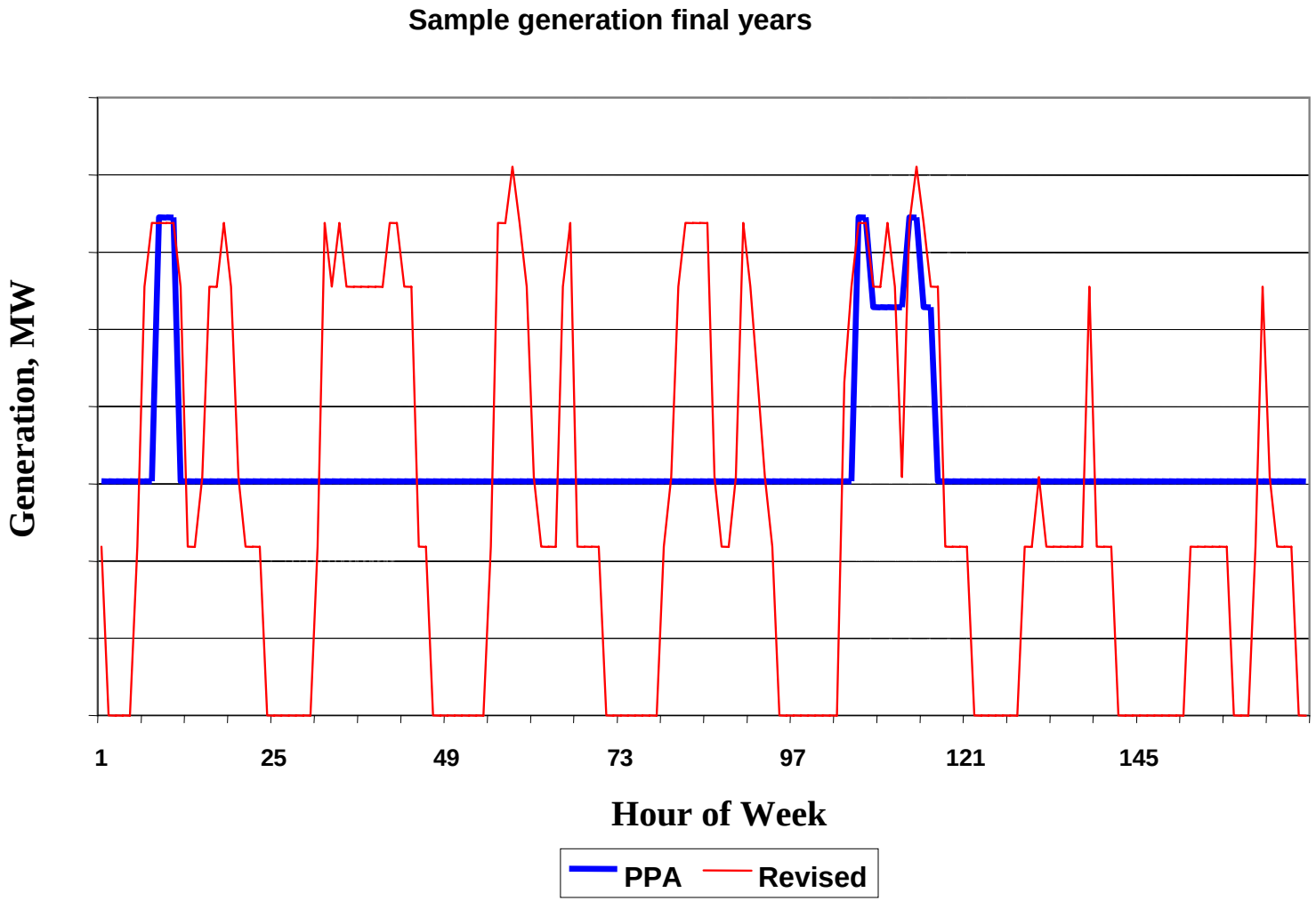


Dispatch Model Results

Sample generation next five years



Dispatch Model Results

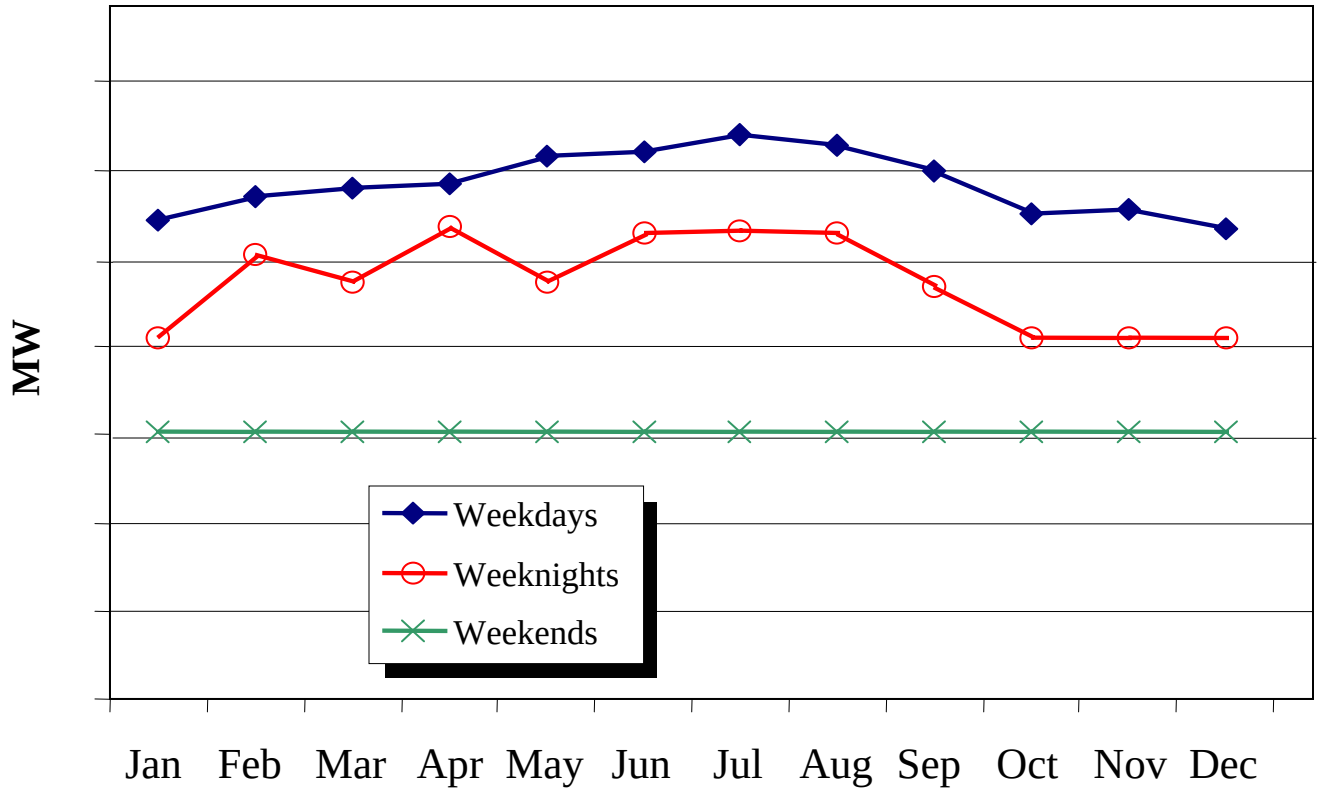


Value Shifts – Buyer

- Purchase Obligations
  - Increased deliveries relative to expected PPA dispatch
  - Scheduled deliveries with no optionality through dispatch
- Energy Price Re-Indexation
  - PPA: fuel cost reimbursement, pricing indexed to WACOG
  - Revised PPA: fuel cost indexed to liquid market-based price
- Portfolio Effects
  - Plant as merchant will change zonal market prices
  - Net change in LMPs is a first-order economic effect

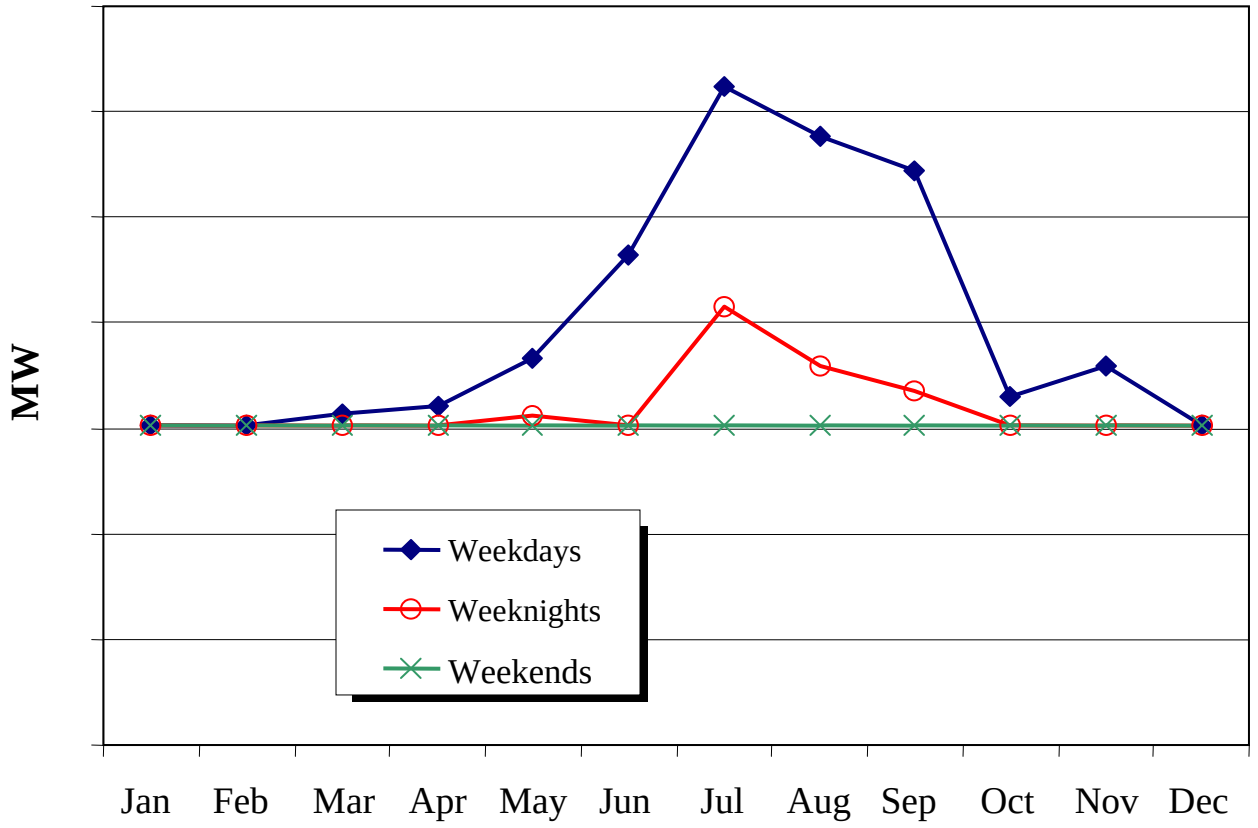
Forecast PPA Delivery Schedule

Next five years

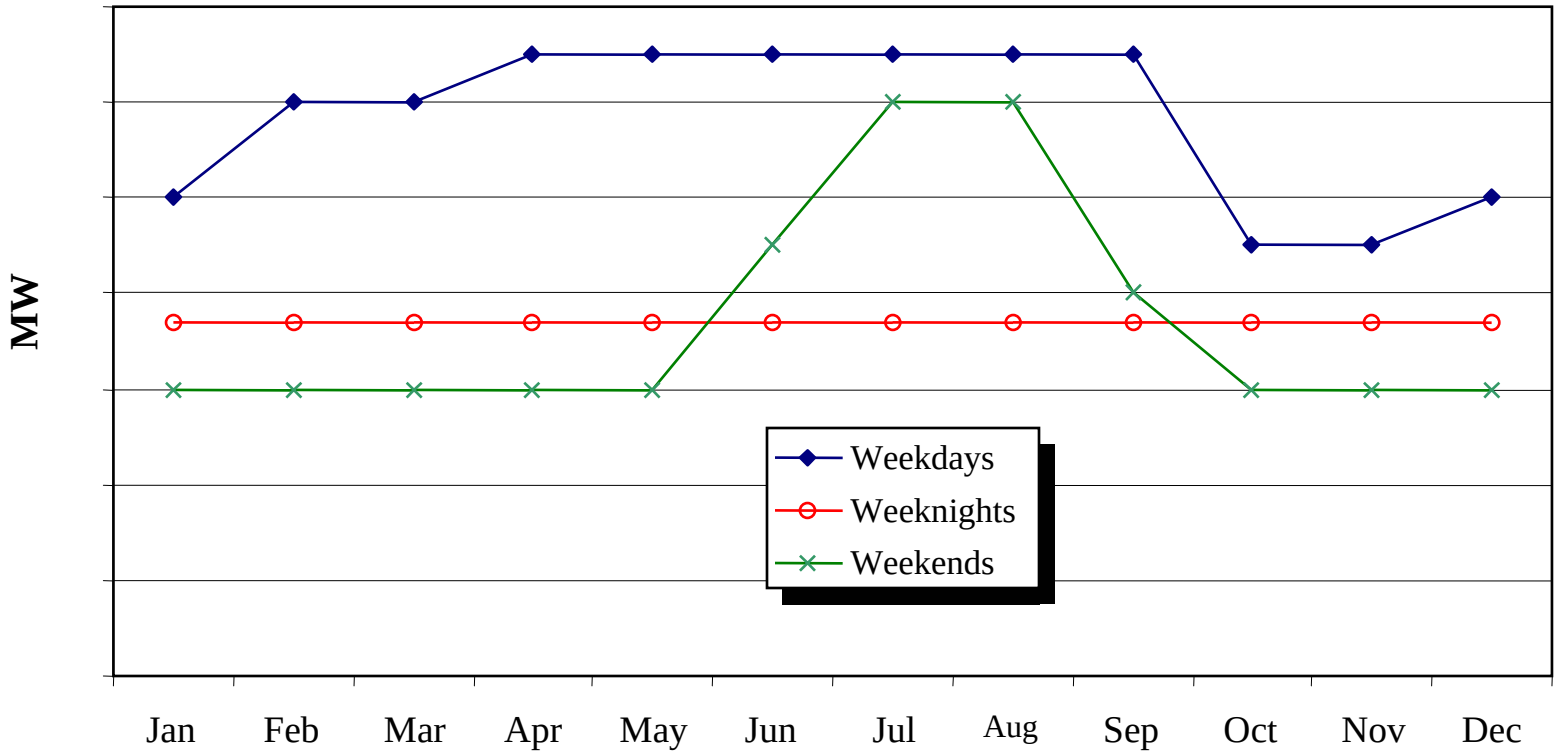


Forecast PPA Delivery Schedule

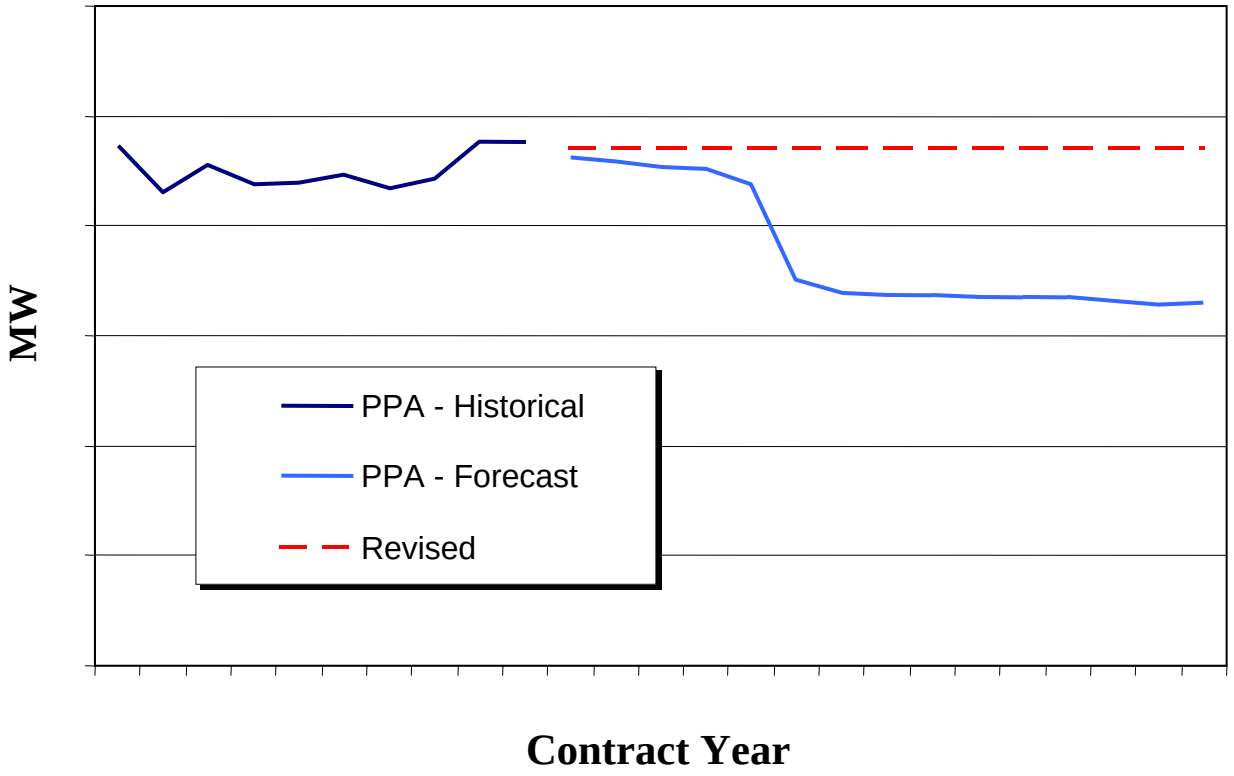
Last ten years



Revised PPA Delivery Schedule

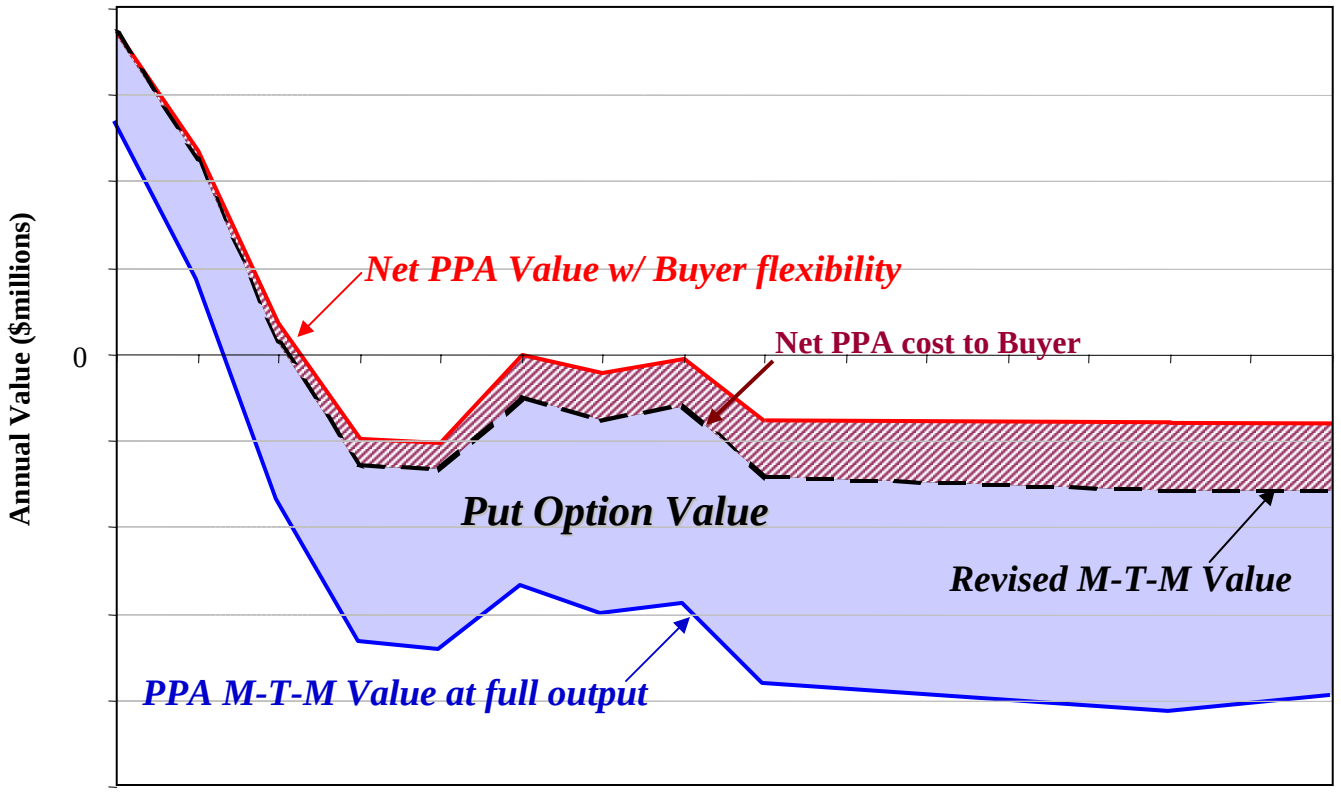


Average Annual Contract Energy

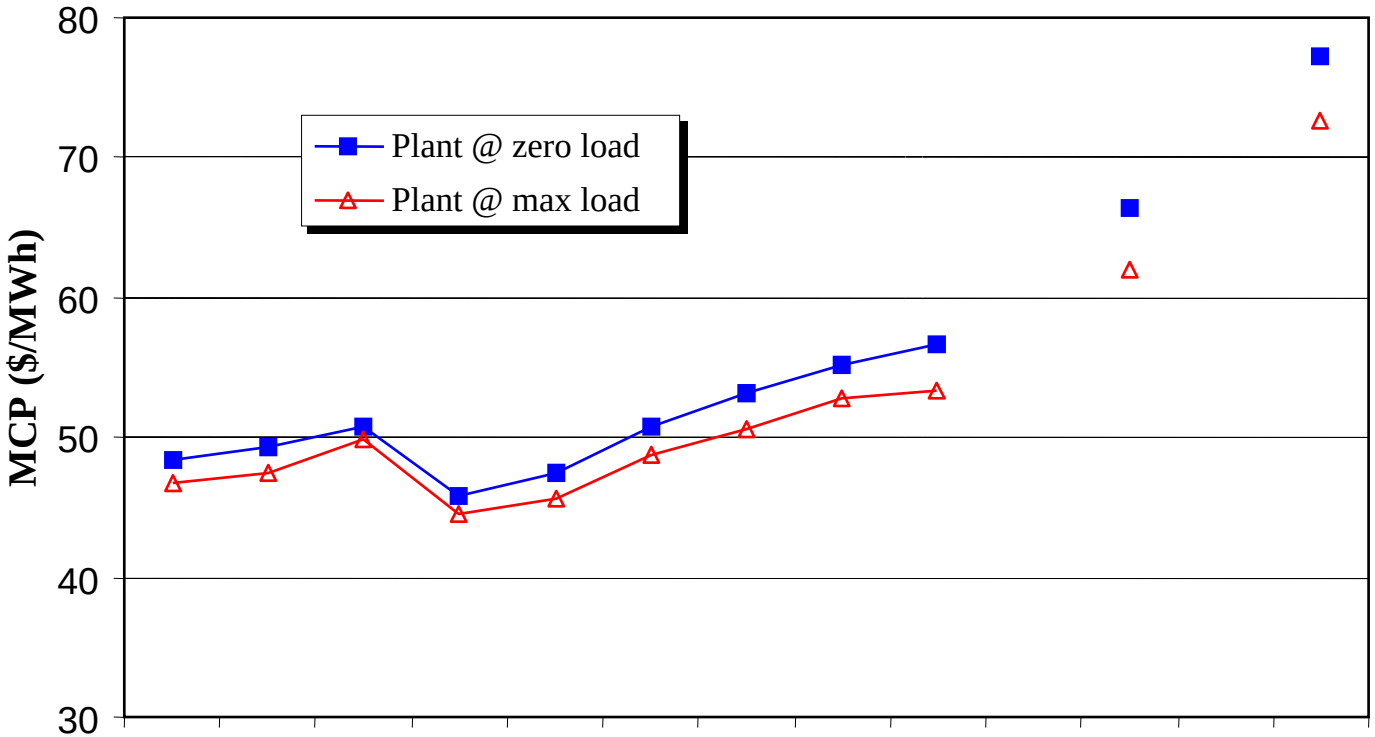


Contract Value Comparison

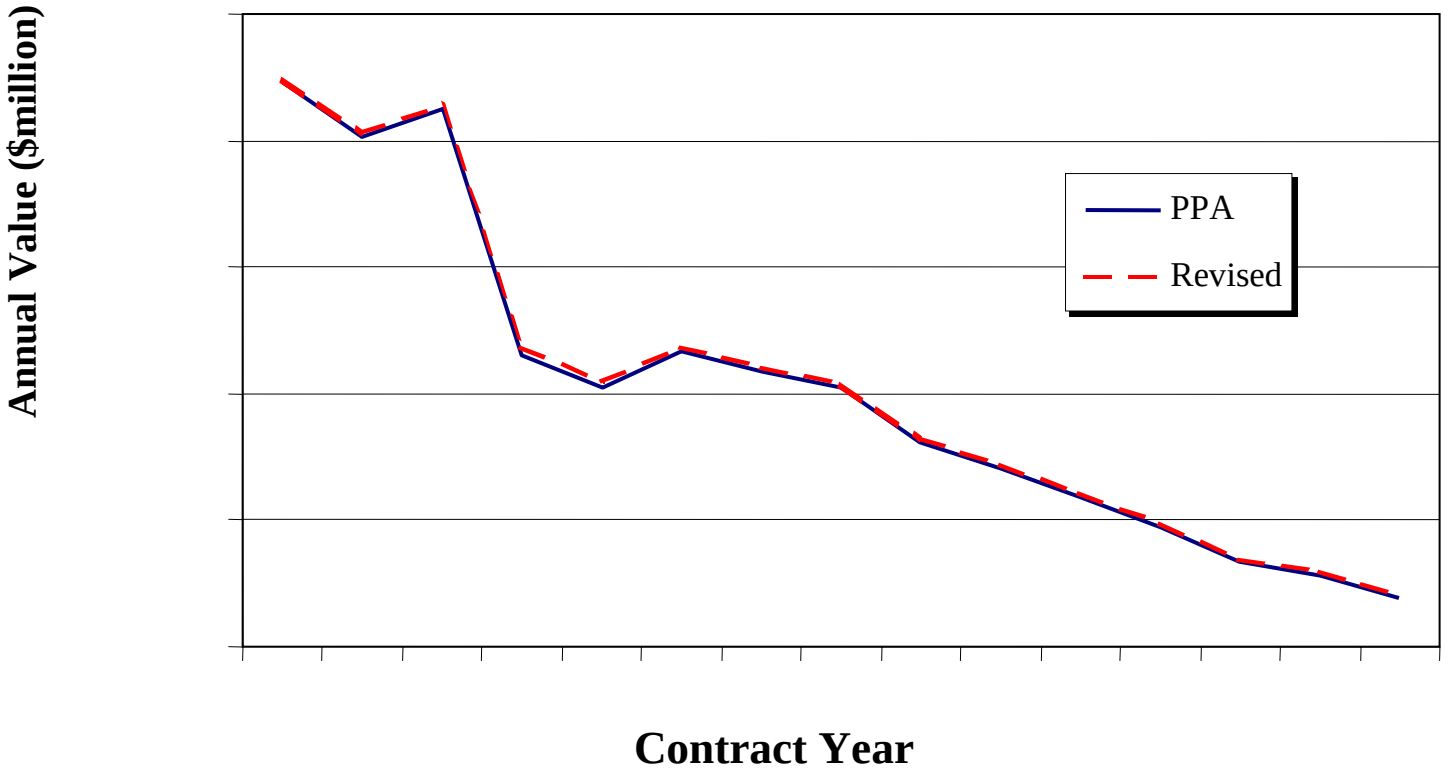
Base Case w/o portfolio effects



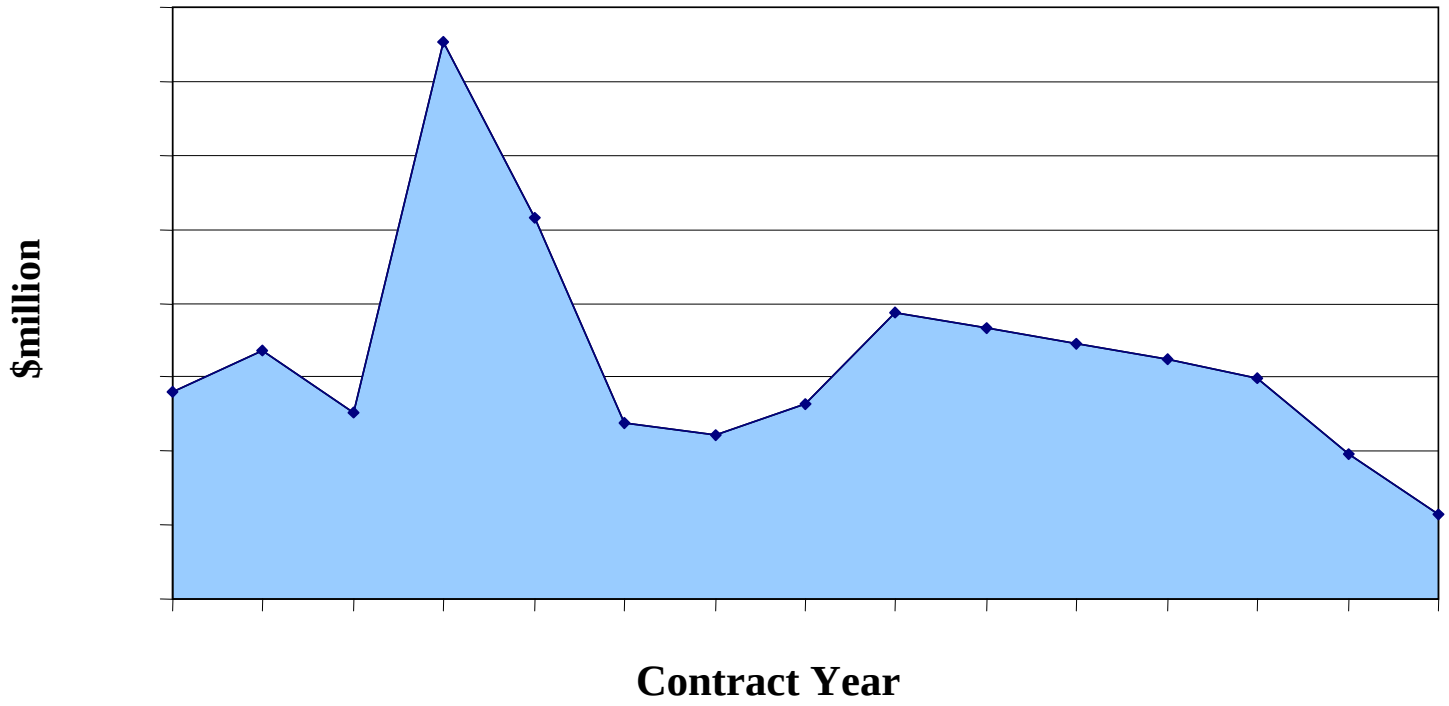
Portfolio Effect



Buyer's Market Energy Costs

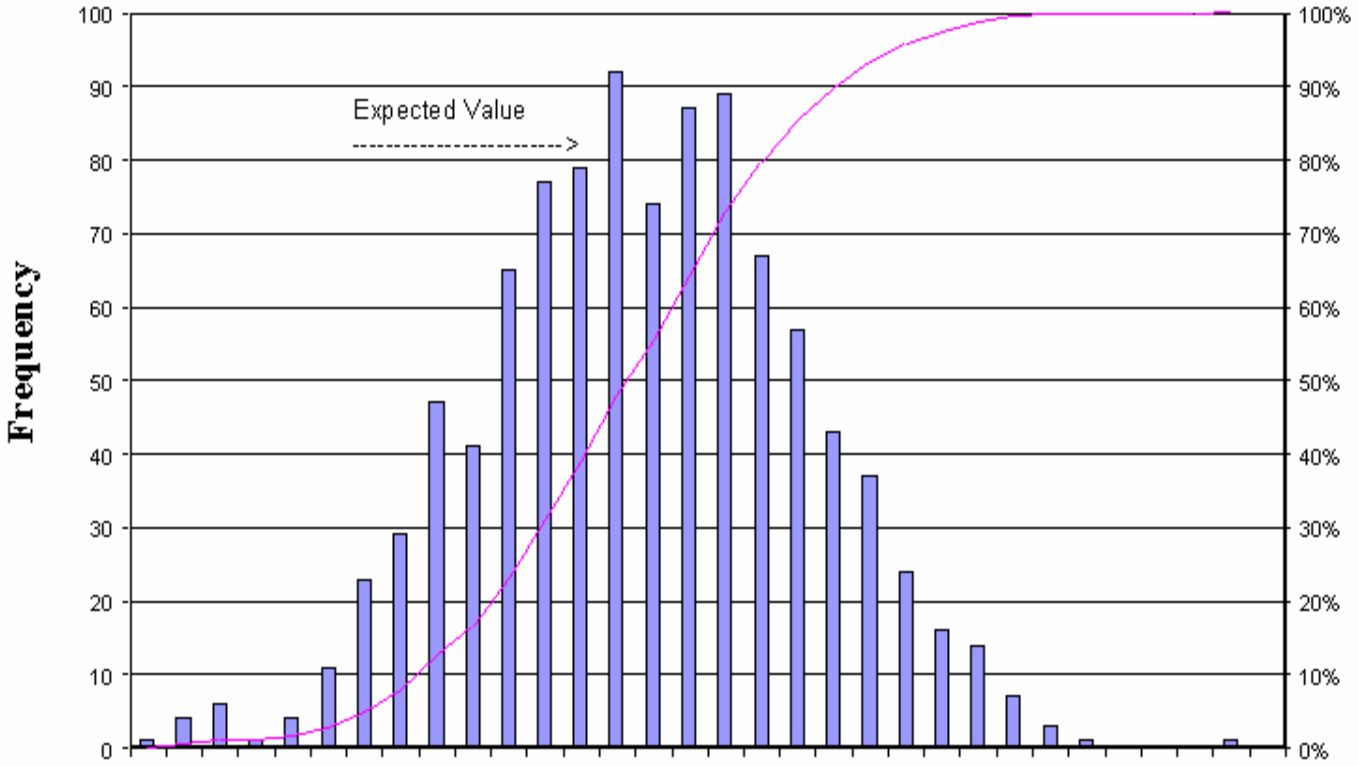


Change in Buyer Procurement Costs



Buyer Value Shift

Probabilistic Results



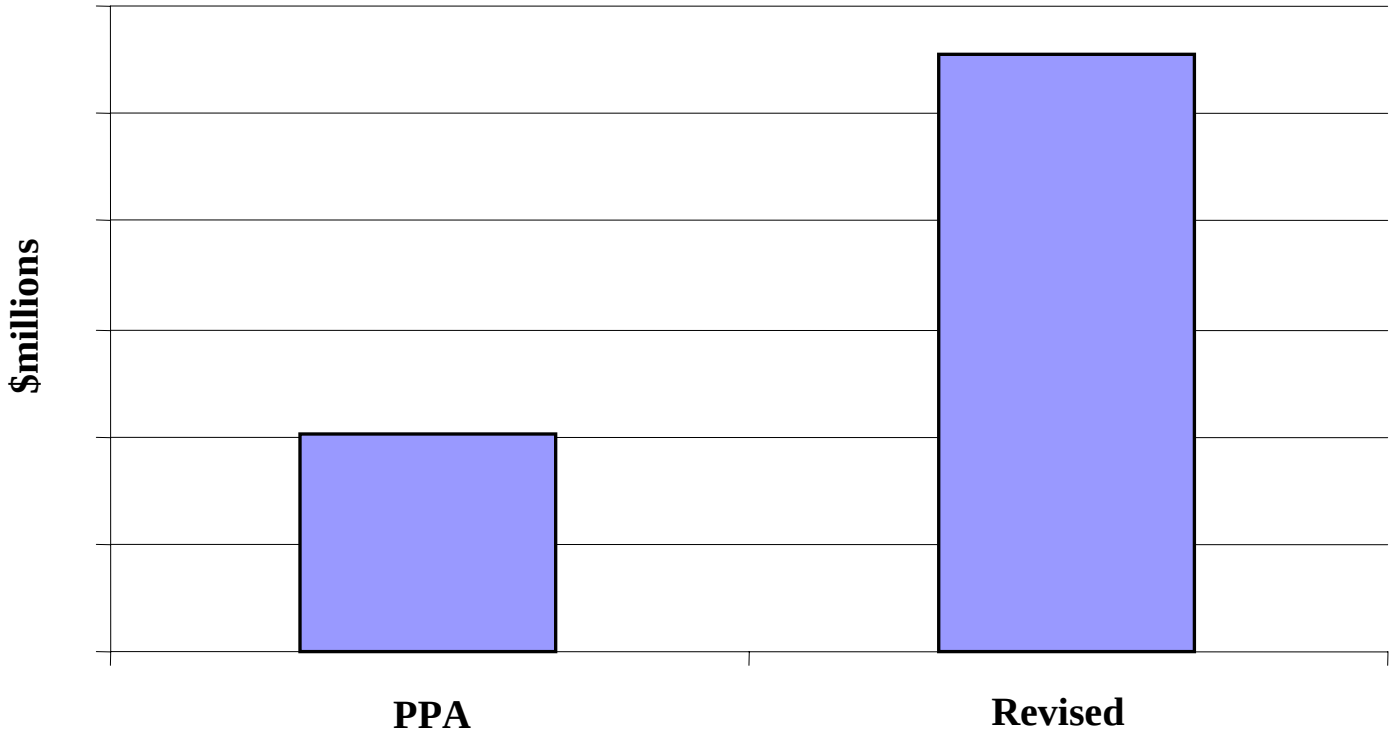
Value Shifts – Seller

- Potential merchant sales during market volatility
- Optionality to source steam requirements and play ancillary service markets
- Termination of gas contracts allows opportunistic procurement of forward gas contracts
- Refinancing under favorable rates & terms

Net result is significant improvement in returns, with limited exposure to market heat rate risks

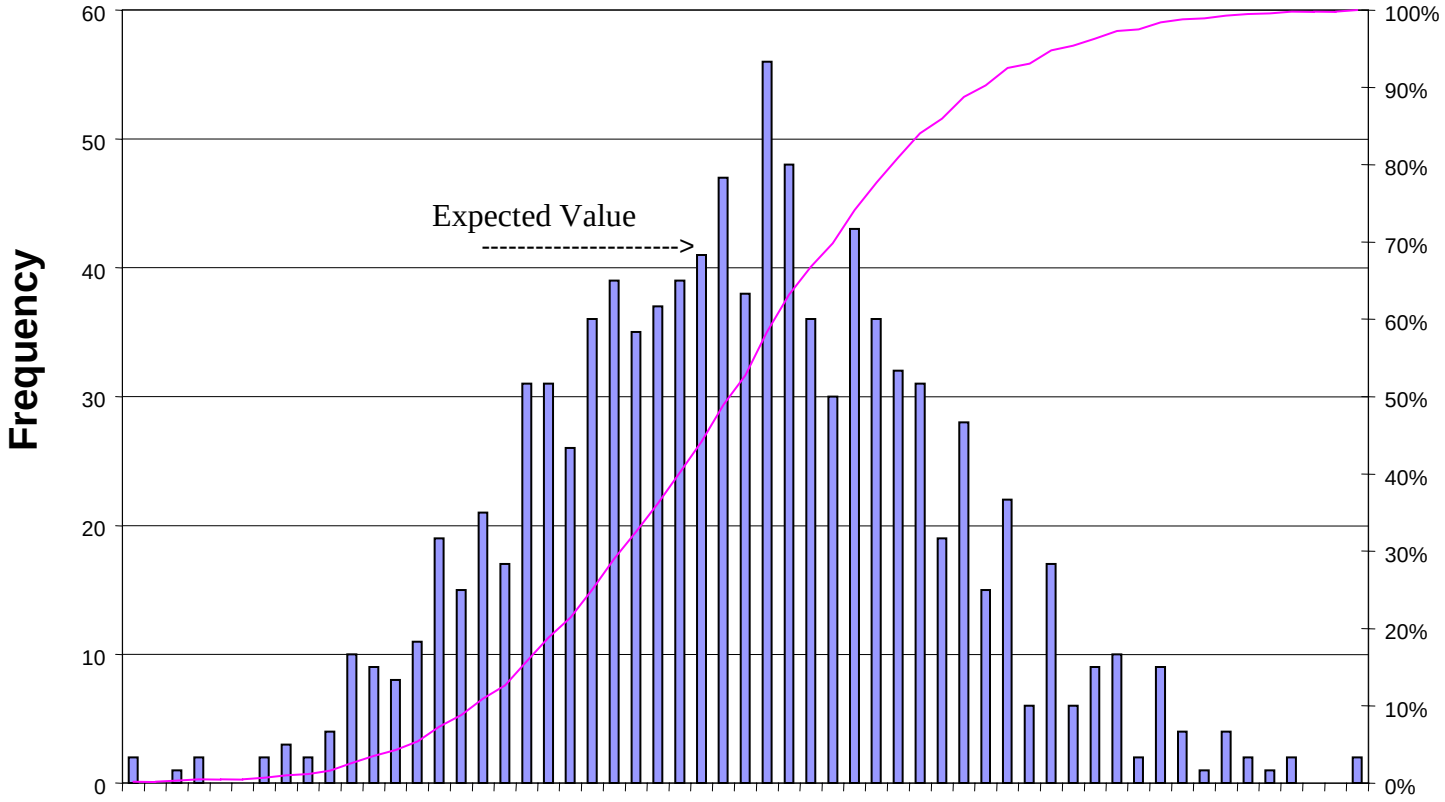
Seller's Financial Results

Base Case



Seller Value Shift

Probabilistic Results



Conclusions

- PPA confers substantial optionality benefits to buyer; revisions almost match benefits if delivery schedule is appropriate
- Freeing plant to operate as a merchant plant will increase buyer's market energy costs - *portfolio effect*
- Tying energy price to liquid gas index promotes hedging
- Seller's benefits adequate to compensate buyer for costs and risks
- Uncertainties regarding buyer's future retail obligations and PUC treatment affect decision whether or not to restructure

Deconstruct every contract facet to realize value; plenty of opportunities in a new market environment!